



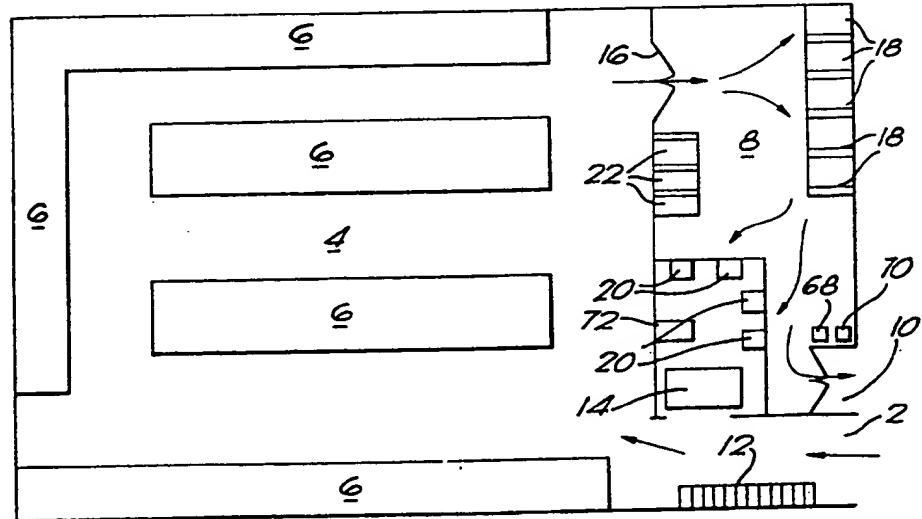
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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## (54) Title: CHECK-OUT INSTALLATION IN A RETAIL OUTLET



## (57) Abstract

A retail outlet, such as a supermarket, contains goods for sale (6) which are collected by a customer and placed in a trolley taken from a collection point (12). The customer is provided with a bar-code reader (3) which has a memory containing data relating to the goods on sale in the supermarket. This data includes, for example, the unit price and unit weight of each item. When the customer selects an item, he scans the bar code on that item using the reader (3) and the price and weight of that item are stored. When the customer has selected all of the goods which he requires, the trolley is weighed at a weighing station (18) which includes a port for the transmission of data between the reader (3) and the weighing station (18). If the total weight of the selected goods stored in the reader (3) matches that measured at the weighing station (18), the data reader is provided with a validation signal, which means that the data reader will be accepted at a payment console (20), so that the customer may pay for the goods and take them from the supermarket without individual checking of the items selected.

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CHECK-OUT INSTALLATION IN A RETAIL OUTLET

TECHNICAL FIELD

This invention relates to an installation in a retail outlet, such as a supermarket, for determining and confirming the total price of articles selected by a customer.

BACKGROUND OF THE INVENTION AND PRIOR ART

GB2068132 discloses a check-out system in which customers use a device such as a bar-code reader to identify each article which they select. The device records not only the price of each article, but also its weight. At the check-out, the total weight of the articles selected by the customer is determined and, if this is consistent with that recorded by the customer using the device, the customer pays the amount recorded by the device. Thus, there is no need for check-out personnel to check each article individually, unless there is a discrepancy between the actual weight and the recorded weight.

A disadvantage of the check-out system disclosed in GB2068132 is that, if the recorded weight does not match the actual weight of the articles selected, with the result that manual checking of each article is required, the particular check-out station concerned is occupied while individual checking takes place. This means that payment by other customers can be delayed, even for those who would not require individual checking of articles.

DISCLOSURE OF INVENTION

According to the present invention, there is provided an installation in a retail outlet for determining and confirming the total price of articles selected by a customer, the installation comprising:

- i) a data reader for receiving input data
- 35 identifying each article selected by the customer, the reader including a memory for storing the total price

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and the total weight of articles selected, as derived from the input data;

ii) a weighing station having weighing apparatus for determining the actual total weight of the articles 5 selected, and having data input means for receiving, from the memory of the data reader, data representing the derived total weight stored in the memory, and signal output means for providing a validation signal to validate the data reader when the actual total 10 weight determined by the weighing apparatus is substantially equal to the derived total weight stored in the memory; and

iii) a payment station having data input means for receiving, from the memory of a validated data reader, 15 data representing the total price of the articles selected.

The separation of the weighing station from the payment station means that customers who need to have their purchases checked manually need not cause delays 20 to other customers. Manual checking can take place at a separate location, leaving the weighing station and the payment station available for use by other customers.

The data reader may comprise a bar-code reader for 25 reading bar codes provided on the articles, or on shelves in the retail outlet. In most instances, the bar codes will merely identify the product concerned (for example by use of EAN or UPC product codes), and consequently it is desirable for the memory of the data 30 reader to contain data representing the unit price of the article, its average gross weight and the standard deviation from the average gross weight.

Alternatively, the bar code could itself provide the necessary price and/or weight information.

35 The data reader may include a display device for displaying such information as a description of the

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last product selected, its price and/or weight, and the total price and/or weight of all of the articles so far selected. The display may also be used to provide error messages and prompts to the customer.

5        The installation may include a storage device for the data readers. The storage device may take the form of a magazine or carousel into which the data readers can be plugged. While plugged into the storage device, they may receive charging current for recharging their 10 batteries, and updating data relating to the goods on sale in the retail outlet.

10       It is usual in retail outlets such as supermarkets for customers to place the goods which they select in a carrier such as a trolley or wire basket. In an 15       installation in accordance with the present invention, it is intended that the entire trolley or wire basket, with the selected articles, is placed at the weighing station. Consequently, to allow for variations in the 20       weights of the trolleys or wire baskets, or at least of 20       those parts which influence the weighing apparatus, it may be necessary for the data reader to receive an input identifying the individual carrier concerned, for example by means of a bar code identification provided on the carrier. The weight determination performed at 25       the weighing station can then take account of the individual weight characteristics of the carrier concerned.

25       Where the carrier is a trolley, it may comprise a supporting framework mounted on wheels, and a container 30       portion supported by the framework in a manner which enables it to be lifted for a short distance from the framework by the weighing apparatus. Thus, the weighing apparatus weighs only the container portion and the articles in it, but not the framework. 35       Consequently, the weighing operation is not affected by, for example, shopping bags or other articles

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carried on the framework, or children sitting in a seat provided on the framework. Also, it is possible for the framework to include a compartment for receiving articles which have been selected by the customer, but 5 which, for some reason, fail to operate the data reader, for example if the bar code on the article is faulty or incomplete.

The payment station may be provided with a printer for producing a print out of the data from a validated 10 data reader, in the form of a list of articles selected, so as to enable the customer to make a check of the selected articles. When the customer accepts the list, and payment is made, a signal from the data reader identifying the carrier concerned may be 15 transmitted to an exit gate, so that the exit gate will open to permit the customer to take the goods for which he has paid out of the store. The exit gate may also be provided with a detector responsive to, for example, an electronic tagging device on each data reader, so 20 that an alarm will be raised if a customer attempts to take a data reader through the exit gate.

BRIEF DESCRIPTION OF DRAWINGS

Figure 1 is a diagrammatic floor plan of a supermarket;

25 Figure 2 shows a carrier in the form of a supermarket trolley;

Figure 3A is a perspective view of a data reader;

Figure 3B is a front view of the data reader of Figure 3A;

30 Figure 3C is an underneath view of the data reader of Figure 3A;

Figure 4 shows a weighing station;

Figure 5 shows a storage device for data readers; and

35 Figure 6 shows a block diagram of a supermarket payment control system.

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MODE FOR CARRYING OUT THE INVENTION

The supermarket represented in Figure 1 has an entrance 2, through which customers pass to enter the sale area 4, where goods for sale are displayed on 5 gondolas and other shelving units 6. When customers have selected the goods which they require, they pass to a checking and payment area 8 and, after payment, to an exit 10.

On entering the sales area by way of the entrance 10 2, customers can collect a trolley 1 (which will be described in more detail later) from a collection point 12. They also collect a data reader 3 (which also will be described in greater detail later) from a magazine 14. As the customer passes through the sales area 4, 15 each article selected is recorded by the data reader as it is placed in the trolley. For this purpose, the articles for sale are marked with a bar code which is read by the data reader. The data reader records the price and weight of each article by recalling the 20 information from the memory of the data reader once the product has been identified from its bar code. Alternatively, the bar code on the article may include 25 price and/or weight data. At various points around the sales area, carrier bags or other containers for use by the customer may be available so that the goods selected can be packaged conveniently as they are collected from the shelves. Even if such carrier bags are provided free of charge, they will have a bar code so that their weight can be recorded, since the carrier 30 bags will contribute to the total weight of the articles placed in the trolley.

When the customer's selection is complete, he passes through a one-way gate 16 into the checking and payment area 8. In this area, there are weighing 35 stations 18 into which the customer inserts the loaded trolley. The weighing stations also include means for

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retrieving information from the data reader, and consequently a comparison is made between the actual weight of the goods in the trolley and the weight recorded in the data reader. If these weights 5 correspond with each other, the customer is directed to payment stations 20 at which payment for the goods is made and the data reader is handed in for replacement in the magazine 14. The customer then leaves the supermarket through the exit 10.

10 If the measured weight of the goods fails to correspond to that recorded in the data reader the customer is directed from the weighing station 18 to a manual checking station 22, where service personnel of the supermarket will manually check the articles in the 15 customer's trolley before payment is made at the payment stations 20.

A trolley 1 is shown in Figure 2. The trolley comprises a wheeled frame 24 having a handle 26, a child's seat 28 and a compartment 30. A main container 20 32 in the form of a basket, for receiving articles selected by the customer, is mounted in the frame 24 by means of spigots 34, provided on the container 32, which extend into brackets 36 fitted to the frame 24. Thus, in normal use, the weight of the container 32 is 25 supported on the frame 24, although it can be raised slightly from the brackets 36 for weighing, as will be described later.

The handle 26 is provided with a clip 38 for receiving the data reader, and is also provided with a 30 bar code 40 identifying the trolley concerned and, in particular, identifying the weight of the container 32.

The data reader 3 is shown in Figures 3A, 3B and 3C. It comprises a moulded body 42 provided, at one end, with a bar code reader 44. On one face of the 35 body 42, there is a display device 46, for example a liquid crystal display, a "+" button 48, a "-" button

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50 and a light emitting diode 52. At the end of the body 42 away from the bar code reader 44, there is a connector 52, for both power and data transmission.

The data reader includes a memory and a  
5 rechargeable battery. For normal use, the memory contains data representing the price, average gross weight and standard deviation from the average gross weight of each article for sale in the supermarket. For some products, for example fruit and vegetables  
10 which are selected by the customer in the quantity that he requires, a price label is applied by him or by a member of the supermarket staff after weighing the selected produce. This price label will include a bar code identifying the product and its price, and the  
15 memory in the data reader will include data representing the price per unit weight of that product. Consequently, the data reader can convert the price, read from the bar code on the product, to a weight.

As a customer selects an article, he presses the  
20 "+" button 48 which activates the reader and then uses the reader to read the bar code on the article. Confirmation that the bar code has been read correctly is provided by a short flash from the LED 52 and possibly also by an audible signal such as a bleep. If  
25 a customer changes his mind and wishes to remove an article which he has formerly selected, he presses the "-" button 50 and then uses the reader to read the bar code on that article before replacing it on the shelf.

The display 46 will indicate the last transaction,  
30 for example it will carry the description of the last article added to or removed from the trolley, including its price, and the number of articles of that description which have been added or taken out. The display will also show the total price of all the  
35 articles so far selected. The display device 46 may also be used to display error messages and prompts to

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the customer.

The data reader will not function to read bar codes from articles selected by the customer until it has been activated by reading the bar code 40 on the 5 trolley (Figure 2). When this has been done, the reader is directly associated with that particular trolley. If a customer wishes to use more than one trolley, then the bar code 40 for each trolley must be read before any selection of articles is made.

10 To avoid unnecessary power consumption, the bar code reader 44 is deactivated after a valid bar code has been read, or after a predetermined period has expired following operation of one of the buttons 48 or 50. The bar code reader 44 is reactivated following 15 use of either of the buttons 48 or 50.

Figure 4 shows a weighing station 18. The weighing station comprises a floor panel 56, on which is supported a weighing unit 57 including a weighing platform 58 and a socket 60 for receiving the reader. 20 There is also a display 62 providing instructions and guidance to the customer.

Photoelectric devices 64 are provided to detect the presence of a trolley or basket, and to distinguish between the two. A bar-code reader (not shown) at the 25 weighing station may automatically read the bar-code of a trolley as it is moved onto the weighing platform 58. The weighing platform 58 has a recess in it (not shown) for receiving a wire basket. When a trolley is wheeled onto the floor panel 56 and its presence detected by 30 the photoelectric devices 64, the panel 56 rises a short distance so that the wheels of the trolley are trapped in recesses 66. This prevents removal of the trolley until weighing is complete.

The weighing unit then operates by raising the 35 weighing platform 58 by a short distance. Where a trolley is present in the weighing station, raising of

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the weighing platform 58 lifts the container 32 off the brackets 36, so that the weighing unit 57 is responsive only to the weight of the container 32 and its contents. The reader is applied to the socket 60 and 5 transmits to the processing circuitry of the weighing station data relating to the number of trolleys used and the weights of their containers 32 (as derived by reading the bar codes 40 on the trolleys) and the total recorded weight of the articles selected by the 10 customer. If more than one trolley has been used, the display 62 will give instructions to the customer to insert each trolley in turn. The actual weight of the articles selected by the customer is then compared with the total weight recorded in the data reader, applied 15 to the socket 60. If the weights match, a validation code is read into the data reader, and the display 62 instructs the customer to proceed to the payment station.

The payment station includes consoles 20 which 20 each have facilities for receiving payment in the usual ways. The data reader is connected to the payment console and transmits information to the payment console which includes a list of items purchased, the total price and the validation code read into the data 25 reader from the weighing station. The customer is provided with a print-out of the list of items purchased for him to check before payment. When the customer accepts the list, the data reader is removed from the payment console 20, and connected to a socket 30 provided on a cash till. The total price stored in the data reader is then downloaded to the cash till, and payment is made by the customer. Following payment, the customer can proceed to the exit 10. The reader is removed from the till and returned to the magazine 14 35 for resetting and recharging (if necessary).

If payment does not proceed for any reason, for

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example because the customer is unable to pay or requires an adjustment to the list of articles, a "reject" button is pressed, the data reader is removed from the payment console and the customer is directed 5 to the manual checking stations 22.

At each manual checking station 22 there is a bar code scanner, for use by a manual check-out operator, and a connection for the customer's data reader. If 10 the manual check-out system finds an article which accounts for the failure in the normal weighing and payment routine, this is announced to the operator and payment may proceed without a complete manual check of the entire contents of the trolley.

At the exit 10, there is a trolley verifying 15 device 68 and a data reader alarm 70. The trolley verifying device is coupled to the magazine 14. When payment has been made, the subsequent replacement of the data reader in the magazine 14 generates a signal which is transmitted to the trolley verifying device 68 20 identifying the trolley or trolleys in question. As a customer approaches the exit 10, the bar code 40 on the trolley is read and a one-way gate at the exit 10 will open only if the trolley is one for which a signal has been received from the magazine 14.

25 The data reader alarm 70 is provided to prevent unauthorised removal of the data readers from the premises, either intentionally or by mistake. The data readers may, for example, be provided with a tagging device which will activate the alarm 70 if a data 30 reader is taken through the exit 10.

As shown in Figure 6, the entire system comprising the weighing stations 18, the manual checking stations 22, and the magazine 14 is connected to a computer 72. This enables these parts of the system to communicate 35 with one another. For example, the sales area 4 may be provided with keypads having direct access to the

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computer 72, for operation by security personnel. If a member of the security staff in the sales area 4 observes a customer who is apparently abusing the system, he can use one of the keypads to inform the 5 computer 72 of the number of the trolley in question. The trolleys may be provided with easily read alphanumeric identifying numbers for this purpose. The computer 72 will then provide an appropriate signal to the weighing stations 18 which will cause them to 10 reject the trolley in question automatically so that it is presented for manual checking. An administration terminal may be provided at which store personnel will be able to call up on to a screen data relating to 15 operation of the system, for example a list of the trolley numbers currently suspected of fraud or user error.

The magazine 14 is shown in Figure 5. The magazine comprises a base unit 74 to which a plurality of holders 76 are fitted. Each holder 76 has a 20 plurality of sockets 78 for receiving the readers.

The base unit 74 includes charging circuitry for providing power to the holders 76 and the readers received in the sockets 78 for charging the batteries in the reader. Also, the sockets 78 are 25 interconnected, so that a "master" reader may be inserted into one of the sockets 78 to up-date all of the other readers. For example, if articles are added to the stock list, or if prices change, this information can be conveyed to all of the readers in 30 the magazine without needing to update each reader in a separate operation. Alternatively, up-dating data could be provided from the computer 72 to the base unit 74 for transmission to all of the readers.

The holders 76 are connected to the base unit 74 35 in a manner which enables them to be fitted in either of two positions, offset by 180° from each other.

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Operators in the checking and payment area 8 can insert readers into the magazine 14 from one side and then, when a holder 76 is full of readers which are fully charged, it can be turned round so that the readers are 5 presented to customers entering the sales area 4 through the entrance 2.

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CLAIMS

1. An installation in a retail outlet for determining and confirming the total price of articles selected by a customer, the installation comprising:
  - 5 i) a data reader (3) for receiving input data identifying each article selected by the customer, the reader (3) including a memory for storing the input data;
  - ii) a weighing station (18) having weighing apparatus (57) for determining the actual total weight of the articles selected, and having data input means (60) for receiving, from the memory of the data reader (3), the data identifying the articles selected, and comparison means for comparing the total weight of articles selected, as derived from the input data, with the actual total weight of the articles selected; and
  - 15 iii) a payment station (20) having data input means (60) for receiving, from the memory of a data reader (3), data representing the total price of the articles selected,
- 20 characterized in that the weighing station (18) comprises signal output means for providing a validation signal to validate the data reader (3) when the actual total weight determined by the weighing apparatus (57) is substantially equal to the derived total weight, and in that the payment station (20) is adapted to distinguish between validated and unvalidated data readers (3).
2. An installation as claimed in claim 1, characterised in that the payment station (20) is at a different location from the weighing station (18).
- 30 3. An installation as claimed in claim 1 or 2, characterised in that the data reader (3) comprises a bar-code reader (3).
- 35 4. An installation as claimed in any one of the preceding claims, characterised in that the memory of

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the data reader (3) contains data representing the unit price of each article, and/or its average gross weight and/or the standard deviation from the average gross weight.

5. An installation as claimed in any one of the preceding claims, characterised in that a storage device (14) for a plurality of the data readers (3) is provided, which storage device (14) is provided with current supply means for supplying charging current for 10 recharging batteries of the data readers (3), and/or with communication means for transmitting, to the data reader (3)s, updating data relating to the goods on sale in the retail outlet.

6. An installation as claimed in any one of the preceding claims, characterised in that a plurality of carriers (1) are provided for receiving the articles selected by a customer, each carrier (1) having identification means (40) readable by the data reader (3).

20. 7. An installation as claimed in claim 6, characterised in that there is an exit gate (10) to prevent unauthorized removal of carriers (1) from the retail outlet, a carrier sensor (68) being provided adjacent the exit gate (10) for determining the 25 identity of a carrier (1) at the exit gate (10), the exit gate (10) being operable, to permit the passage of a carrier (1), in a response to a release signal identifying that carrier.

8. An installation as claimed in any one of the preceding claims, characterised in that a plurality of trolleys (1) are provided for receiving the articles selected by a customer, each trolley (1) comprising a supporting framework (24) mounted on wheels, and a container portion (32) supported by the framework (24) 35 in a manner which enables it to be lifted from the framework by the weighing apparatus (57).

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9. An installation as claimed in claim 8, characterised in that the framework (24) has a compartment (30) for receiving articles independently of the container (32).

5 10. An installation as claimed in any one of the preceding claims, characterised in that the payment station (20) is provided with a printer for producing a print out of data from a validated data reader (3).

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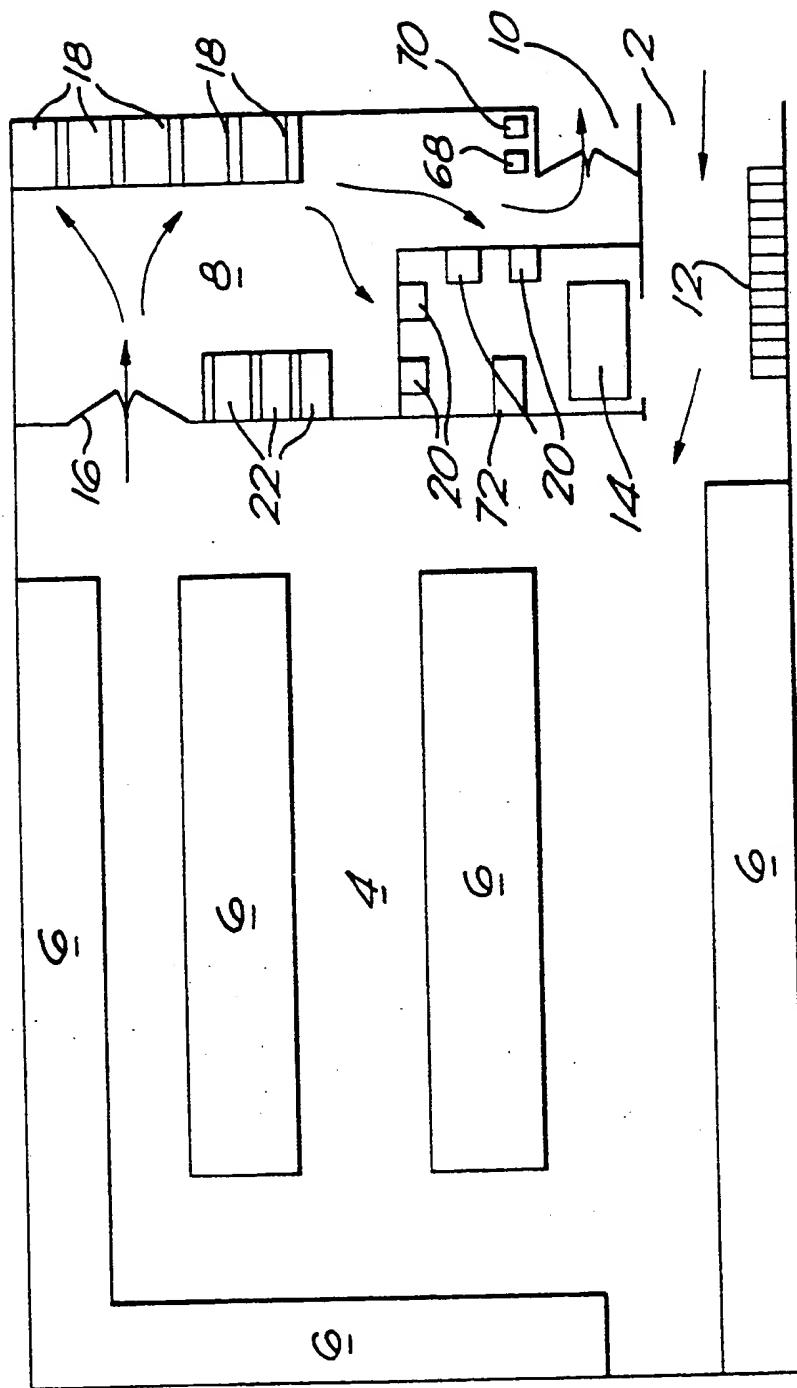
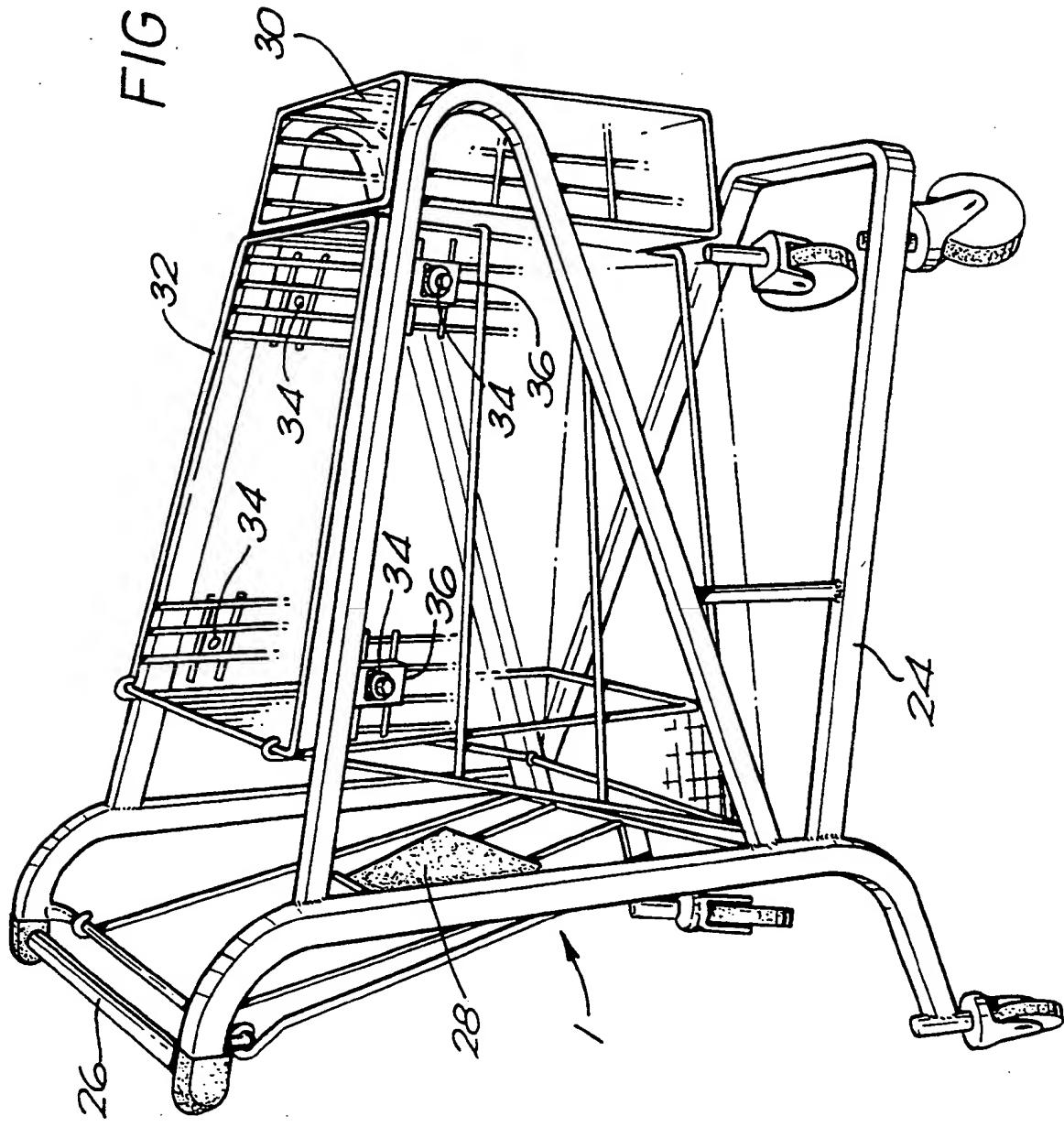


FIG. 1

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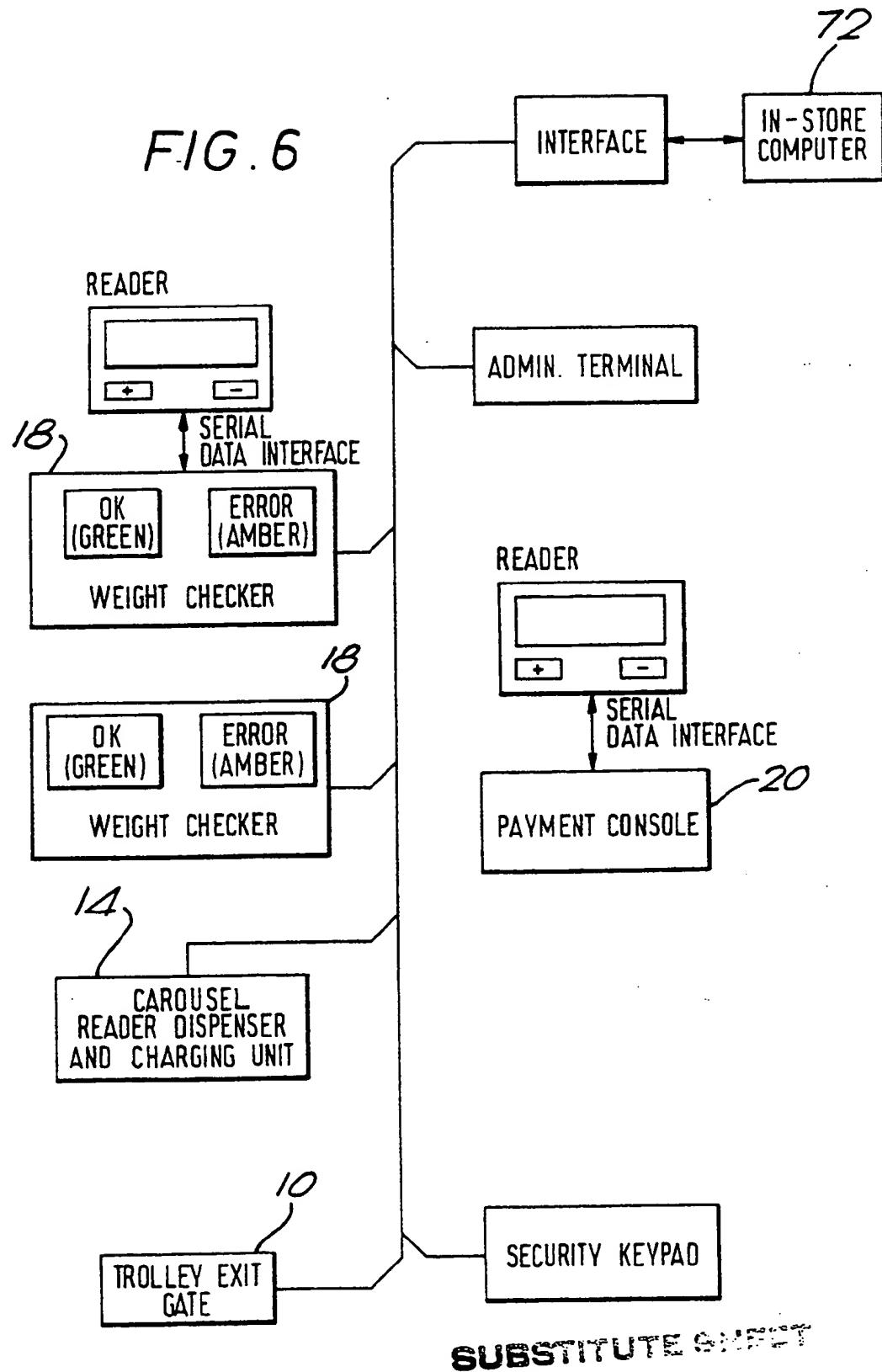
FIG. 2

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FIG. 6



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FIG. 4

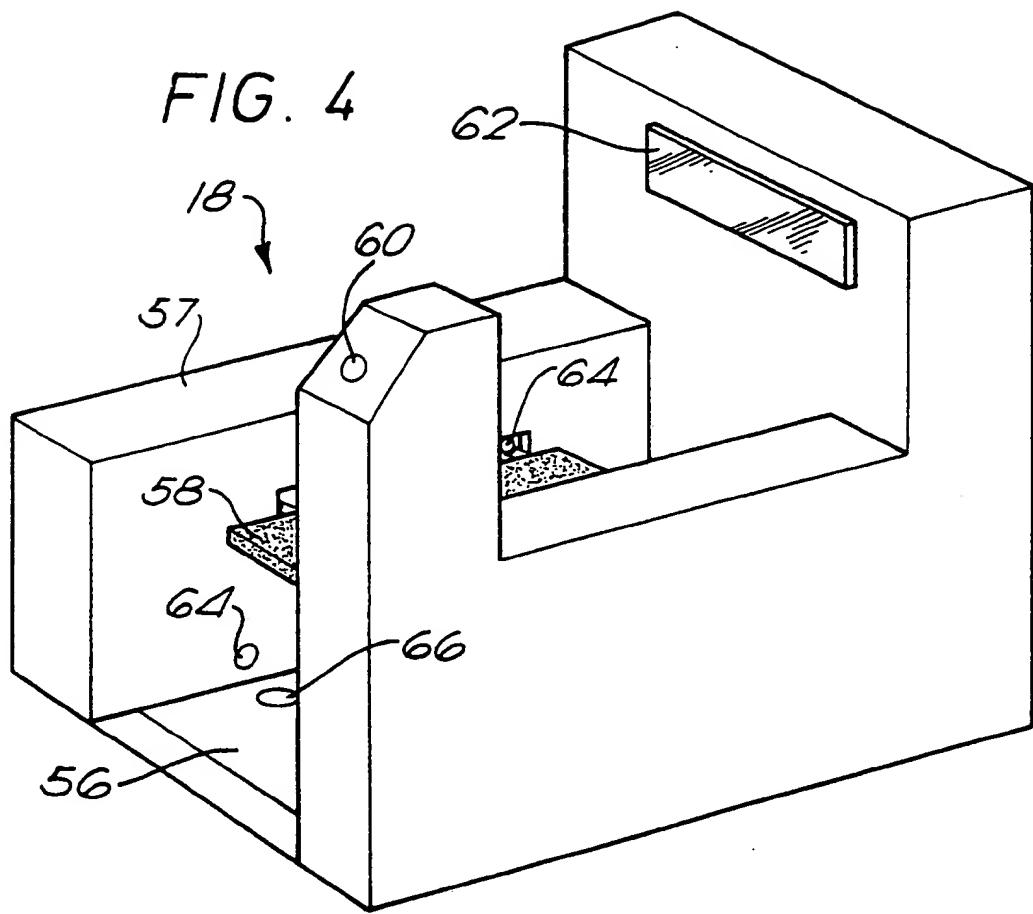
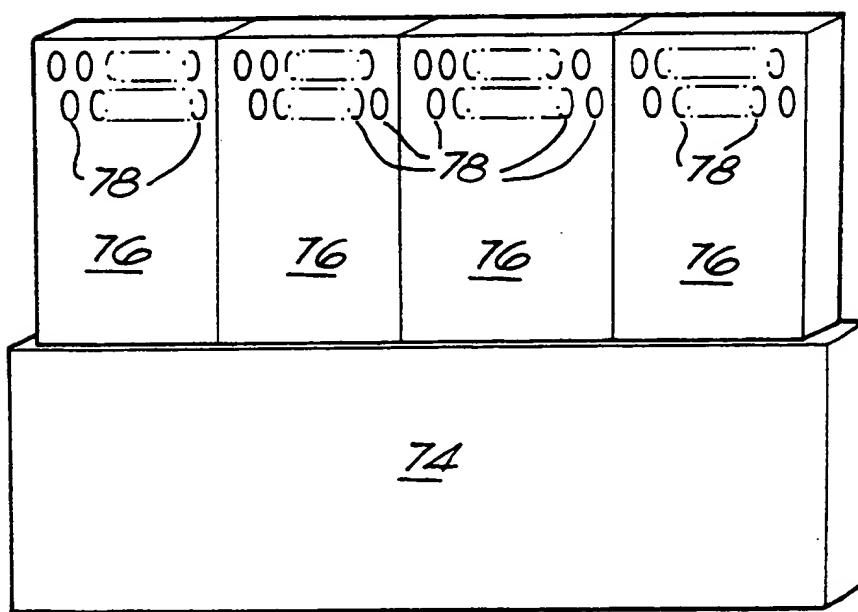


FIG. 5



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FIG. 3A

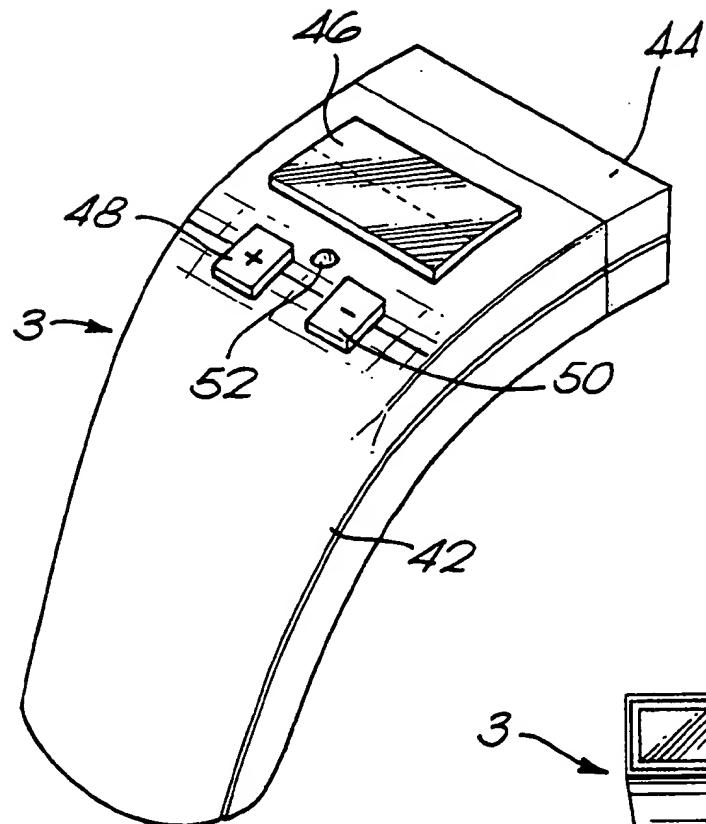


FIG. 3B

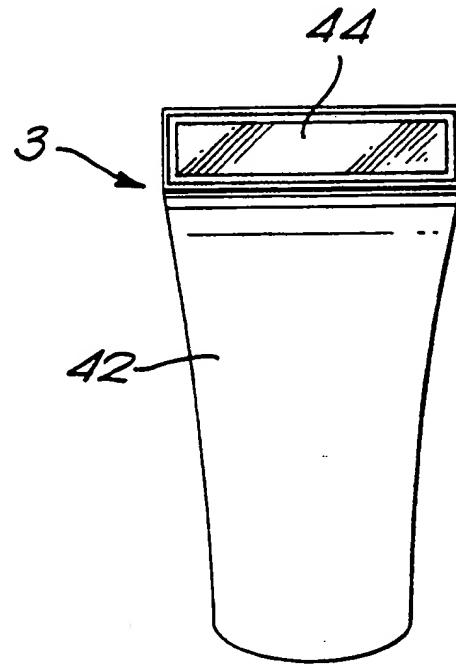
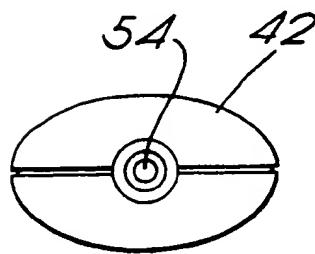


FIG. 3C



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ANNEX TO THE INTERNATIONAL SEARCH REPORT  
ON INTERNATIONAL PATENT APPLICATION NO.

GB 9100942  
SA 48426

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Patent document cited in search report	Publication date	Patent family member(s)		Publication date
NL-A-8800907	01-11-89	None		
US-A-3749191	31-07-73	None		
GB-A-2068132	05-08-81	US-A-	4373133	08-02-83
WO-A-8804813	30-06-88	US-A- EP-A- JP-T-	4779706 0294470 1501738	25-10-88 14-12-88 15-06-89

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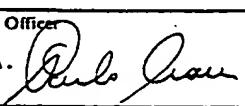
For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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## INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 91/00942

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) <sup>6</sup>		
According to International Patent Classification (IPC) or to both National Classification and IPC Int.C1. 5 G01G19/414 ; G07F7/02		
II. FIELDS SEARCHED		
Minimum Documentation Searched <sup>7</sup>		
Classification System	Classification Symbols	
Int.C1. 5	G01G ; G07F ; G07G ; A47F	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched <sup>8</sup>		
III. DOCUMENTS CONSIDERED TO BE RELEVANT <sup>9</sup>		
Category <sup>9</sup>	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>
A	NL,A,8 800 907 (AHOLD N.V.) November 1, 1989 see abstract ---	1, 3-5
A	US,A,3 749 191 (R.H.K. ASHEN ET AL.) July 31, 1973 see column 5, line 6 - line 27; figure 5 ---	1
A	GB,A,2 068 132 (NICHOLAS CLYNE) August 5, 1981 cited in the application see page 3, line 85 - line 115 ---	1
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IV. CERTIFICATION		
Date of the Actual Completion of the International Search 1 27 AUGUST 1991	Date of Mailing of this International Search Report 13. 09. 91	
International Searching Authority EUROPEAN PATENT OFFICE	Signature of Authorized Officer GANCI P.A. 	

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